

BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division INDUSTRIAL HYGIENE GROUP Standard Operating Procedure	NUMBER IH94520
	REVISION FINAL Rev0
SUBJECT: Center[®] 337 Mini Light Meter	DATE 03/10/08
	PAGE 1 OF 7

Contents

- 1.0 Purpose/Scope**
- 2.0 Responsibilities**
- 3.0 Definitions**
- 4.0 Prerequisites**
- 5.0 Precautions**
- 6.0 Procedure**
- 7.0 Implementation and Training**
- 8.0 References**
- 9.0 Attachments**
- 10.0 Documentation**



1.0 Purpose/Scope

The purpose of this document is to provide a simple field procedure for operating the *Center[®] 337 Mini Light Meter*. This meter is used in working environmental checks, illumination design verifications and other light monitoring applications. The procedure for operating the *Center[®] 337 Mini Light Meter* is based on the information provided in the operator manual.

"Visible light" corresponds to a wavelength range of 400 - 700 nanometers (nm) and a color range of violet through red. The meter has its strongest spectral sensitivity response from 500 nm to 600 nm [green through orange]. The highest sensitivity is at 560 nm (yellow). The meter will not detect Violet [400 nm] and has weak sensitivity to Blue [475nm] and Red [650 nm]. It is ideal for responding in a manner similar to the human eye for the mixture of colors in sunlight and artificial lighting.

2.0 Responsibilities

- 2.1 This procedure is implemented through the SHSD Industrial Hygiene Group. Members of the SHSD Industrial Hygiene Group and other groups can qualify to use this meter based on demonstrated competency documented in Attachment 9.1.
- 2.2 Hazard Analysis of the Sampling Task: The Qualified Sampler and their line supervisor are responsible to comply with all work planning and work permit system requirements.

BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division INDUSTRIAL HYGIENE GROUP Standard Operating Procedure	NUMBER IH94520
	REVISION FINAL Rev0
SUBJECT: Center[®] 337 Mini Light Meter	DATE 03/10/08
	PAGE 2 OF 7

2.3 The Qualified Sampler is required to request and check the instrument in and out of the IH lab in accordance with the SOP's IH51200 & 51500.

3.0 Definitions:

Footcandle: (fc) is a non-SI unit of luminance or light intensity widely. The unit is defined as the amount of illumination the inside surface an imaginary 1-foot radius sphere would be receiving if there were a uniform point source of one candela in the exact center of the sphere. Alternatively, it can be defined as the illuminance on a 1-square foot surface of which there is a uniformly distributed flux of one lumen. The foot-candle is equal to one lumen per square foot.

Lux: The SI derived unit of illuminance is the lux.. One lux is equal to one lumen per square metre.

One footcandle is equal to 10.76 lux. Typically this is approximated as 1 footcandle being equal to 10 lux. Because lux and footcandles are different units of the same quantity, it is valid to convert footcandles to lux and vice versa.

Qualified Sampler: A person who has demonstrated competency in accordance with Section 7 to perform this field procedure and is approved to independently use the *Center[®] 337 Mini Light Meter*.

4.0 Prerequisites

For SHSD personnel, the SHSD Industrial Hygiene Group Leader, or designee, will qualify personnel in the use and interpretation of results from the *Center[®] 337 Mini Light Meter* via Attachment 9.1.

5.0 Precautions

5.1 **Hazard Determination:**

- This meter does not generate a hazard to the operator or occupants.
- Testing does not generate Hazardous Wastes or have negative environmental consequences.
- The meter does not cause significant ergonomic concerns in routine use.
- The meter does not have a noise hazard.
- Operation of this meter is covered under the Job Risk Assessment [SHSD JRA-05](#).

5.2 **Personal Protective Equipment**

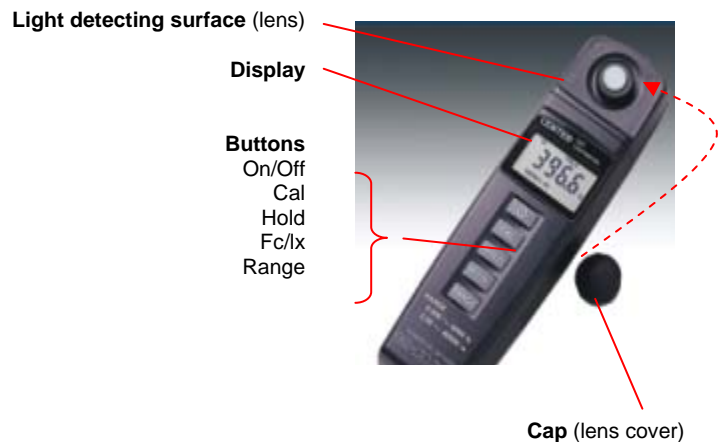
- Typically, this meter is primarily used for measuring lighting levels in office spaces and shop areas where there is no risk to the sampler from hazardous levels of chemical or radiological contamination. Personal Protective Equipment is typically not needed.

BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division INDUSTRIAL HYGIENE GROUP Standard Operating Procedure	NUMBER IH94520
	REVISION FINAL Rev0
SUBJECT: Center[®] 337 Mini Light Meter	DATE 03/10/08
	PAGE 3 OF 7

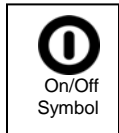
- For work done where there is a potential for chemical or radiological hazards to be present, a hazard assessment to determine the appropriate protective measures based on the hierarchy of controls is to be done by a cognizant ESH professional.

6.0 Procedure

6.1 Equipment: Center[®] 337 Mini Light Meter.



6.2 **Turning on and zeroing of the unit:** With the black cover over the lens, press the On/Off key once. The meter turns on. The meter display will flash “-CAP-“, then “CAL “. The meter will then automatically zero and “0.00” should appear.



6.3 **Calibration of the equipment:** The meter was purchased with NIST calibration. It is not necessary to calibrate the unit prior to each use. Calibration of the unit is done by returning it to a vendor or replacement with a new unit. The unit is not to be used if over **5 years** from the date of calibration. Note: The “CAL” the meter performs at start up is a self zeroing of the meter and must be done with the cap over the light sensor.

6.4 **Operation of the meter:** The monitor immediately displays the reading in footcandles [fc] or lux [lx] on powering the unit. No warm-up is necessary. [The sensor is compensated with a filter to make the response close to human eyes. The light source angle is also compensated according to its cosine function.]

6.5 Changing Settings

- The meter starts up in *auto-range* and that is the best mode to operate in. Pressing

<p align="center">BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division</p> <p align="center">INDUSTRIAL HYGIENE GROUP Standard Operating Procedure</p>	<p>NUMBER IH94520</p>
	<p>REVISION FINAL Rev0</p>
<p>SUBJECT: Center[®] 337 Mini Light Meter</p>	<p>DATE 03/10/08</p>
	<p>PAGE 4 OF 7</p>

the **RANGE** button activates the *manual range* selection and the meter moves from the lowest to the next range each time the **RANGE** button is pressed. The display indicates the range in the lower left corner.

- The meter is switched between foot candles [fc] and lux [lx] by pressing the **fx/lx** button. Note 10 lx = 1 fc

6.6 **Holding a reading for viewing:** When a reading needs to be taken at a location where the display can not be seen, such as over the user's head, pressing the **HOLD** button captures the reading on the display at the time the button is pressed. The value continues to be displayed until the **HOLD** button is pressed again. Note: the meter does not store values when the power is off or log data for later retrieval.

6.7 **Turning off the unit:** Press the **On/Off** key and the meter will shut off. No data is stored.

6.8 **Recording readings:** The survey should be recorded on the BNL [Direct Reading Instrument form](#) for procedure IH60500.

6.9 **Analyzing data from the meter:** The following table presents the light meter recommendation of the Illuminating Engineering Society of North America and are used as the guidance for acceptable light levels: [Note 10 lx = 1 fc]

ANSI/IESNA RP-1-04 Office Lighting	A. Public Spaces	30 lx	3 fc
	B. Simple orientation for short visits	50 lx	5 fc
	C. Working Spaces where simple visual tasks are performed	100 lx	10 fc
	D. Performance of visual tasks of high contrast and large size	300 lx	30 fc
ANSI/IESNA RP-7-01 Lighting Industrial Facilities	E. Performance of visual tasks of high contrast and small size or tasks of low contrast and large size	500 lx	50 fc
	F. Performance of visual tasks of low contrast and small size	1000 lx	100 fc
	G. Performance of visual tasks of near threshold(critical importance, specialized, very small or very low contrast)	3000 to 10,000 lx	300 to 1000 fc

7.0 **Implementation and Training**

7.1 Use of this meter is to be performed only by persons who have demonstrated the competence as documented using Attachment 9.1 *Job Performance Measure*.

7.2 Qualification Frequency & Recordkeeping: The supervisor of *Qualified Samplers* are

<p align="center">BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division</p> <p align="center">INDUSTRIAL HYGIENE GROUP Standard Operating Procedure</p>	<p>NUMBER IH94520</p>
	<p>REVISION FINAL Rev0</p>
<p>SUBJECT: Center[®] 337 Mini Light Meter</p>	<p>DATE 03/10/08</p>
	<p>PAGE 5 OF 7</p>

responsible to ensure that the employees remain competent in the operation of this meter.

- Personnel need to be re-qualified when there is evidence that they do not clearly understand the principles of operation of this meter.
- The re-qualification frequency is 3 years. However, if a person has not used this instrument for a period of over 12 months from the date of last qualification, demonstration of competency to perform this procedure to the satisfaction of the supervisor may be required before sampling commences.

8.0 References

8.1 Center Technology Corp.: Instruction Manual, *Center[®] 337 Mini Light Meter*.

9.0 Attachments

9.1 *Job Performance Measure*

10. Documentation

Document Development and Revision Control Tracking		
<p>PREPARED BY: R. Selvey (signature on file) IH Group Leader Date 03/06/08</p>	<p>REVIEWED BY: J. Peters (signature on file) IH Field Supervisor Date</p>	<p>APPROVED BY: R. Selvey (signature on file) IH Group Leader Date 03/07/08</p>
<p>ESH Coordinator/ Date: <i>none</i></p>	<p>Work Coordinator/ Date: <i>none</i></p>	<p>SHSD Manager / Date <i>none</i></p>
<p>QA Representative / Date: <i>none</i></p>	<p>Training Coordinator / Date: <i>none</i></p>	<p>Filing Code: IH52</p>
<p>Facility Support Rep. / Date: <i>none</i></p>	<p>Environ. Compliance Rep. / Date: <i>none</i></p>	<p>Effective Date: 03/10/08</p>
<p>ISM Review - Hazard Categorization <input type="checkbox"/> High <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Low/Skill of the craft</p>	<p>Validation: <input type="checkbox"/> Formal Walkthrough <input checked="" type="checkbox"/> Desk Top Review <input type="checkbox"/> SME Review Name / Date: Mary Chuc 03/07/08</p>	<p>Implementation: Training Completed: Tracked in BTMS Procedure posted on Web: 03/10/08 Hard Copy files updated: 03/10/08 Document Control on forms: 03/10/08</p>

The only official copy is on-line at the SHSD IH Group website.
Before using a printed copy, verify that it is current by checking the document issue date on the website.

BROOKHAVEN NATIONAL LABORATORY Safety & Health Services Division INDUSTRIAL HYGIENE GROUP Standard Operating Procedure	NUMBER IH94520
	REVISION FINAL Rev0
SUBJECT: Center[®] 337 Mini Light Meter	DATE 03/10/08
	PAGE 6 OF 7

Revision Log
Purpose: <input type="checkbox"/> Temporary Change <input type="checkbox"/> Change in Scope <input type="checkbox"/> Periodic review <input type="checkbox"/> Clarify/enhance procedural controls
Changed resulting from: <input type="checkbox"/> Environmental impacts <input type="checkbox"/> Federal, State and/or Local requirements <input type="checkbox"/> Corrective/preventive actions to non-conformances <input type="checkbox"/> none of the above
Section/page and Description of change: SME Reviewer/Date: (signature on file)

IH94520 Attachment 9.1 HP-IHP-94520

Environmental, Safety, Health & Quality Directorate
SHSD Industrial Hygiene

Operation of the *Center*[®] 337 Mini Light Meter Job Performance Measure (JPM) Completion Certificate

Candidate's Name	Life Number:
------------------	--------------

Practical Skill Evaluation: Demonstration of Sampling Methodology

Criteria	Qualifying Performance Standard	Unsatisfactory	Recovered	Satisfactory
Sampling Equipment	Knows where equipment needed for the procedure is located and how to properly sign it out.			
Meter Operation- On/Off	Demonstrates the proper way to set up, turn on and use the meter.			
Meter Operation- ZERO	Demonstrates the proper way to ZERO the meter.			
Meter Operation- HOLD	Demonstrates the proper way to HOLD a value on the screen.			
Meter Operation- fx/lx	Demonstrates knowledge of units and their meaning.			
Meter Operation- RANGE	Demonstrates the proper way to change ranges on the meter.			
Record forms	Shows how to correctly and completely fill all forms associated with this SOP.			
Data Analysis	Shows how to correctly have the data analyzed and compared to regulatory drivers. Knows the correct limits.			
Employee Notification	Knows how to timely and properly notify workers and management of unsafe conditions.			

Employee: I accept the responsibility for performing this task as demonstrated within this JPM and the corresponding SOP.

Candidate Signature:	Date:
----------------------	-------

Evaluator: I certify the candidate has satisfactorily performed each of the above listed steps and is capable of performing the task unsupervised.

Evaluator Signature:	Date:
----------------------	-------